
Novel C1q receptor-mediated signaling controls neural stem cell behavior and neurorepair.

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Public Summary:

C1q plays a key role as a recognition molecule in the immune system, driving autocatalytic complement cascade activation and acting as an opsonin. We have previously reported a non-immune role of complement C1q modulating the migration and fate of human neural stem cells (hNSC); however, the mechanism underlying these effects has not yet been identified. Here, we show for the first time that C1q acts as a functional hNSC ligand, inducing intracellular signaling to control cell behavior. Using an unbiased screening strategy, we identified five transmembrane C1q signaling/receptor candidates in hNSC (CD44, GPR62, BAI1, c-MET, and ADCY5). We further investigated the interaction between C1q and CD44, demonstrating that CD44 mediates C1q induced hNSC signaling and chemotaxis in vitro, and hNSC migration and functional repair in vivo after spinal cord injury. These results reveal a receptor-mediated mechanism for C1q modulation of NSC behavior and show that modification of C1q receptor expression can expand the therapeutic window for hNSC transplantation.

Scientific Abstract:

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